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*Economic Policy Reform and  
Competitiveness Project*

# Evaluation of the NDC's technical capacity to perform the function of the Independent Market Operator

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## **ABBREVIATIONS AND ACRONYMS**

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CES	Central Energy System
CHP	Combined Heat Plant
CMS	Cash Management System
EES	Eastern Energy System
ERA	Energy Regulatory Authority
GoM	Government of Mongolia
JSC	Joint Stock Companies
MZBA	Main Zero Balance Account
NDC	National Dispatch Center
UES	United Energy System
WES	Western Energy System

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## **INTRODUCTION**

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This evaluation is performed as a part of an assignment to develop a set of implementable market rules and operating procedures to assure a transition of power market structure of Mongolia from the current “Single Buyer Market” model to a market model based on bi-lateral contracts supplemented by a spot market. The evaluation is limited to the assessment of the National Dispatch Center (NDC) staff’s capability to perform the function of the market operator, such as development of dispatch schedules, implementation of bi-lateral agreements between generation and load serving entities, monitoring of actual market participant’s performance, administering the spot market, performing market settlement and billing, collection and disbursement duties.

Assessment of the NDC’s capability to perform the function of a system/market operator such as metering, telemetering, data acquisition and communication with interconnected entities using modern hardware and software is a part of a separate task order and is not discussed here.

## **SECTION I: GENERAL DESCRIPTION OF NDC RESPONSIBILITIES**

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As in any electric power system, the National Dispatch Center (NDC) plays a key role in operating the power system.

The NDC is responsible for dispatch of the Central Energy System transmission network (CES) in a reliable and safe manner. CES is the main Mongolian electric system which represents 80% of all Mongolia power supply. The NDC was created as a LLC and its shares were distributed to the Ministry of Infrastructure (51%) and to the State Property Committee (49%).

The CES power supply under NDC dispatch is comprised of five coal burning generating plants and interconnection to UES of Russia.

The main responsibility of the NDC is to assure the safe, reliable and efficient operation of the interconnected electric power system. This is accomplished by issuing operational instructions to the generating stations, substations, transmission and distribution companies; preparation of load forecasts; calculation of electrical and thermal regimes; development of dispatch schedules; coordination of the outage schedules for generating and transmission equipment; and coordination of power restoration after power outages. In addition to this the NDC is responsible for providing the data necessary to settle the spot market for electric energy which operates under the current "Single Buyer" market framework. These responsibilities involve tracking all generation stations' deviations from the dispatch schedule, pricing these deviations in accordance with ERA approved spot market rules and submission of this data to the transmission company which is responsible for the market settlement and billing.

## **SECTION II: NDC'S RESPONSIBILITIES AS A MARKET OPERATOR**

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The envisioned new market structure presumes that the NDC becomes the market operator with a much wider set of responsibilities. It is envisioned that in addition to its traditional responsibilities as a technological power system operator, the NDC will assume a full set of responsibilities associated with administering the electric power market. These responsibilities include:

- Collecting a variety of information associated with their market activities, such as details of bi-lateral contracts, energy bids (when allowed), proposed outage schedules, etc. from market participants.
- Maintaining confidentiality with regard to market related information
- Collecting from the NDC's operational staff information regarding forced outages and unsanctioned generation deviation and to record this information
- Preparation of dispatch schedules
- Monitoring and recording market participants performance data
- Maintaining the data base of market related data
- Performing market settlement, billing, collection and disbursement functions related to licensees
- Providing explanations to market participants and concerned authorities with regard to decisions undertaken in the course of the system operation and market administration
- Performing all responsibilities listed above in a strict compliance with approved market rules
- Provide training to market participants with regard to market rules and procedures

Only a limited part of these responsibilities are performed by the NDC's staff now.

## **SECTION III: ASSESSMENT OF NDC'S ABILITY TO ACT AS A MARKET OPERATOR**

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### **1. General Organization of the NDC**

The organizational structure of the NDC is shown in Attachment 1:

The NDC's core business departments are Dispatching/Technological Management department and Regimes Department. Their operation is supported by the Communication and Information department. Currently there is a special Project Implementation Group formed directly under the General Dispatcher to support implementation of the SCADA system.

The NDC's Executive Director is responsible for the day-to-day operation of the organization. Department of the administrative, legal and marketing support is reporting directly to the Executive Directors. All other departments report to the Vice Director/General Dispatcher who in turn reports to the Executive Director. The total number of the NDC staff is 42 person.

Currently market supporting activities are concentrated in the Dispatching and Regimes Department. The Regimes Department consists of two teams – relay protection and automatics and Regime Planning team. The Regime Planning team is responsible for calculation of electrical energy and thermal regimes and for the development of the dispatch schedule. Also this group is responsible for tracking generating plant performance, deviations from the dispatch schedule, pricing of the generation deviations in accordance with the spot market rules and submittal of the information to the transmission company for settlement purposes. The team consists of 7 persons; one of them is dedicated to the tasks of tracing deviations and preparation of spot market data to be submitted to the transmission company. Calculations of the electrical regimes are performed using the special software – load flow programs. Other calculations are either performed manually or by using spreadsheet based programs, with manual data entry.

The Dispatching/Technological Control Department consists of 12 persons, mostly dispatchers. Communications with the licensees regarding dispatch control are conducted by telephone and fax. A significant part of the power system is not continually monitored from the control room. Dispatch instructions and related information are recorded in a special logbook, entry to which is performed manually.

### **2. Assessment of the NDC ability to function as a system/market operator**

To continue operate the power system under the current market arrangements, the NDC needs to enhance its data acquisition and communication capabilities as well as acquire modern software for regime calculation, data maintenance and economic calculations. To implement new market arrangements, the NDC responsibilities regarding system/market operations the current NDC's capacity is inadequate.

With regard to dispatcher capabilities to monitor the state of the power system, the situation will improve significantly with the implementation of the "SCADA" system in the new modern control room. These projects are being performed in cooperation with a team of experts from Siemens and are expected to be completed in April of 2006.

Whether these would be sufficient for the new market structure will be determined as part of the assessment of the NDC's capability to perform the functions of a system/market operator such as metering, telemetering, data acquisition and communication with interconnected entities using modern hardware and software. This assessment will be performed as part of a separate task order.

With regard to the responsibilities associated with market administration, settlement, billing, etc., the current NDC's capacity is wholly inadequate.

A separate functional unit needs to be formed which would be dedicated to perform the market administration duties. This unit needs to have an adequate, trained staff, be equipped with modern computerized tools to perform such tasks as load forecasting, load flow and production cost simulation analyses, development of dispatch schedules, generating settlement statements and invoices, etc.

## **SECTION IV: CONCLUSION AND RECOMMENDATIONS**

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As follows from the assessment contained in Section IV the current NDC's capacity to fulfill responsibilities associated with the functions of the System/Market operator is inadequate, as noted in Section IV. Significant enhancements in the areas of workforce and technical tools will be required to bring the NDC to the level of being able to function as a modern power system/market operator.

We recommend that the following measures be implemented in order to bring the capacity of the NDC to function at a level adequate to satisfy the responsibilities of the system/market operator:

- Complete implementation of the "SCADA" system and construction of a new control room
- Implement recommendations resulting from the technical assessment of the NDC's capability to perform the functions of a system/market operator as metering, telemetering, data acquisition and communication with interconnected entities using modern hardware and software
- Form a special adequately staffed department dedicated to fulfill market administration responsibilities within the NDC
- Support the staff dedicated to the market administration with modern computerized tools to perform such tasks as load forecasting, load flow and production cost simulation analyses, development of dispatch schedules, generating settlement statements, invoices, etc...
- Develop the necessary software to perform market administration functions. The software should be strictly consistent with the market rules and procedures
- Provide comprehensive training for the entire NDC staff on their responsibilities under the new market structure
- Implement all necessary "code of conduct" rules

**ANNEX A: STRUCTURE AND ORGANIZATIONAL CHART OF THE NATIONAL DISPATCHING CENTER (NDC)**

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